Nematology Circular No. 98
May 1983

Fla. Dept. Agric. & Consumer Services
Division of Plant Industry

AMOEBIC PREDATION UPON NEMATODES

R. P. Esser[1]

INTRODUCTION: Amoebae (Sarcodina: Rhizopodea) occur in large numbers in almost all soil types. A variety of microflora such as bacteria, fungal spores (1,2), algae, and microfauna consisting principally of protozoans and minute invertebrates are ingested by amoebae.

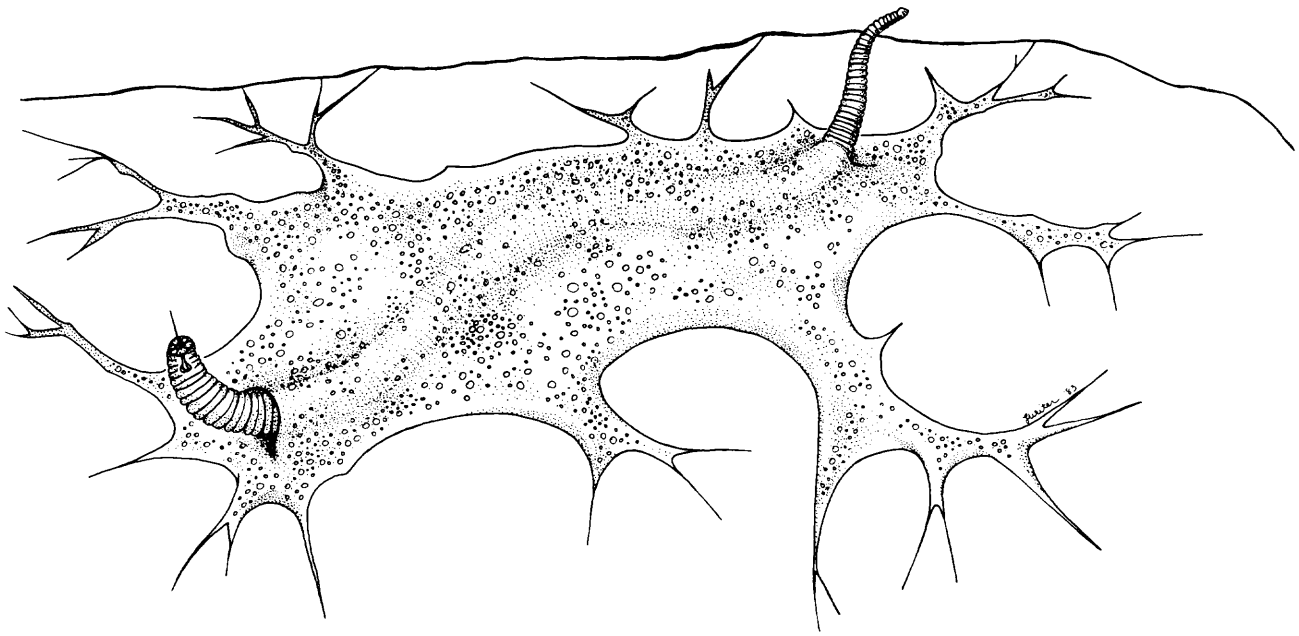

Fig. 1. A cyst nematode larva trapped by an amoeba. Drawing Credit: L. L. Writer, FDACS, DPI, Gainesville, FL. (DPI Photo #702731)

In 1952, a predacious amoeboid organism (5) which was subsequently identified as Theratromyxa weberi Zwillenberg, 1953 (7) was observed attacking and ingesting larvae of the golden nematode, Globodera rostochiensis (Wollenweber, 1923) Mulvey & Stone, 1976. Subsequent publications dealt with amoebae predacious on phytoparasitic nematodes (3,4,6). In Florida, Thecamoeba sp. (but not Theratromyxa weberi) has been observed preying on nematodes.

NEMATODE PREY: The following nematodes have been reported as prey of Theratromyxa weberi (4,5,6): Aphelenchoides rutgersi Hooper and Meyers, 1971; Aphelenchus avenae Bastian, 1865; Ditylenchus dipsaci (Kuhn, 1857) Filipjev, 1936; Globodera rostochiensis; Hemicycliophora sp.; Heterodera schachtii A. Schmidt, 1871; H. trifolii Goffart, 1932; Meloidogyne incognita (Kofoid & White, 1919) Chitwood, 1949; Pratylenchus pratensis (deMan, 1880) Filipjev, 1936; and Rotylenchulus reniformis Linford and Oliveira, 1940. In Florida, Pratylenchus sp. and several unidentifiable nematodes have served as prey for Thecamoeba sp.

AMOEBIC ATTACK: Theratromyxa weberi, upon contacting its prey (principally larvae) flows over the nematode body and assimilates it entirely (Fig. 1). After ingestion, an infolding occurs that results in a smaller digestive cyst in approximately two hours. After 23 hours, the nematode is digested, and the protoplasm within the digestive cyst cleaves, and within 15-20 minutes some 4-10 amoebae emerge from the digestive cyst (4).

Nematodes have been observed several times to be held in a pellicle fold (Fig. 2-A) of Thecamoeba sp. In one case, a nematode escaped from the fold. One occasionally observes an undigested nematode inside the body of an amoeba (Fig. 2-B).

Two nematodes were observed that were ingested lengthwise into the pellicle of Thecamoeba sp. The nematode body inside the pellicle was severely distorted as if compressed during entry (Fig. 2-C-D). The pellicle in both cases formed a lip-like tube about the nematode body.

[1]Nematologist, Bureau of Nematology, P. O. Box 1269, Gainesville, FL 32602.

BIOLOGICAL CONTROL POTENTIAL: Amoebae failed to control root-knot nematodes infecting tomatoes under greenhouse conditions (4). It is unlikely that amoebae will be effective predators of nematodes since most nematodes are muscular and active compared to the slow-moving amoebae that lack muscles. Amoebae are also very sensitive to adverse soil conditions, and will encyst or perish under conditions in which nematodes may thrive.

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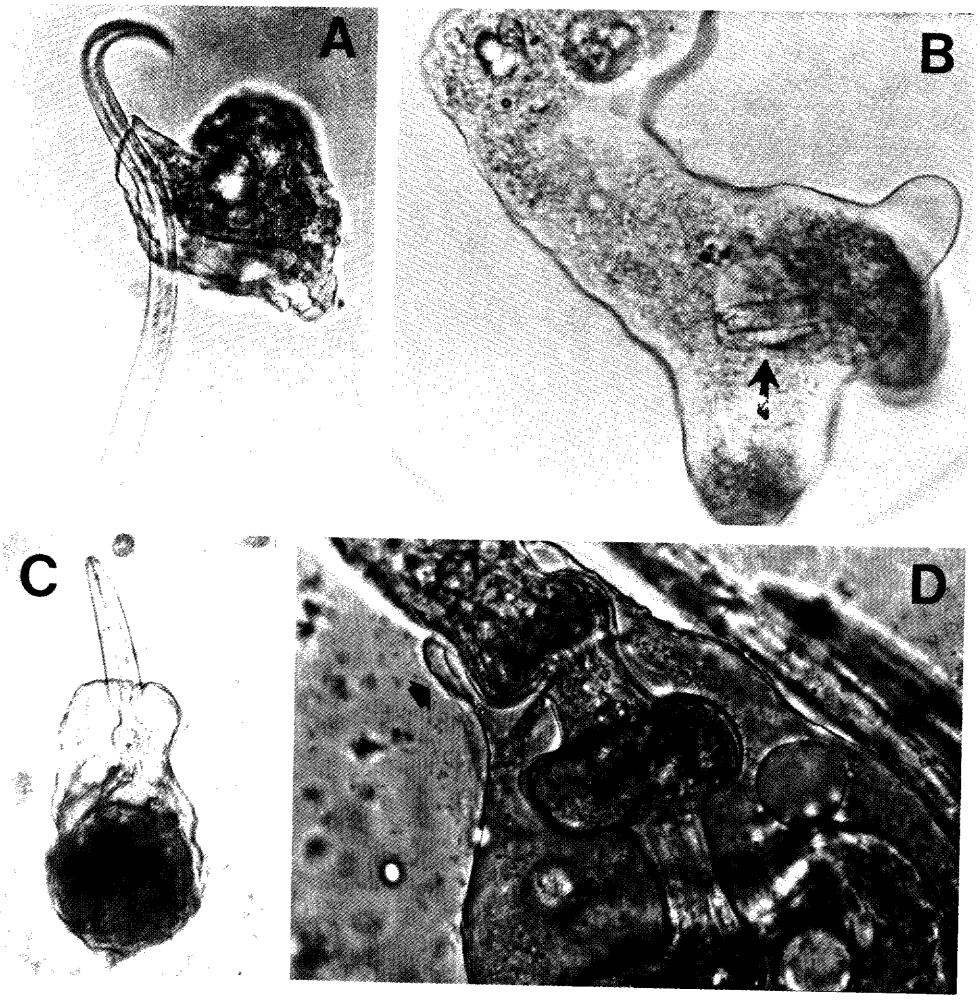

Fig. 2. Nematodes entrapped by amoebae. A. A nematode held in a pellicle fold. B. A nematode inside the body of an amoeba (arrow). C. A tylench entrapped and compressed by a Thecamoeba sp. D. Closeup of the compression of a free-living nematode being assimilated by a Thecamoeba sp.

Contribution No. 264, Bureau of Nematology